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# **The impact of government policy on macroeconomic variables: A case study of private investment in Tanzania**

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AERC Research Paper 89  
African Economic Research Consortium, Nairobi  
March 1999

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# Abstract

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Government policies are critical in determining the rate of economic growth, the levels of private investment and the magnitude of credit to the private sector. Since the adoption of the economic recovery programmes (ERPs) in 1986, Tanzania has embarked on policies that aim to rebalance the role of public and private sector in the economy and thus emphasize private sector development. This is a major departure from the socialist policies of the pre-ERP period that relied heavily on public sector institutions.

The major hypothesis of the paper is that private sector investment is necessary if economic growth is to be accelerated. However, in order to stimulate such investments appropriate monetary, fiscal and exchange rate policies have to be formulated and implemented, along with provision of socioeconomic infrastructure.

In studying private investment in Tanzania it is thus assumed that certain variables will be the major determinants. These are government expenditure on investment, the exchange rate, GDP growth and capital inflows. These variables were incorporated in modelling private investment and their linear and non-linear relationships were analysed.

The results obtained lead to the conclusions that public investment-especially on infrastructure-exerts a positive and significant effect on private investment. Further, foreign exchange availability positively affects private investment. It is found that the policies adopted by the Government of Tanzania since 1986 have enhanced private investment in the economy.

## Acknowledgements

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We wish to acknowledge, with thanks, the African Economic Research Consortium (AERC), whose financial grant made this study possible. We appreciate the contributions of the AERC Technical Committee, resource persons and workshop participants. We would like to mention professors Benno Ndulu, Mohsin Khan, Peter Montiel, David Bevan and John Cuddington, whose encouragement and comments at every stage of the work helped to improve the quality of the study. However, we are solely responsible for any errors and omissions.

# I. Introduction

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Until the mid 1970s Tanzania's economy was characterized by relatively reasonable rates of real growth, a reasonably stable macroeconomic environment and a sustainable resource balance. Between 1966 and 1975 real GDP growth averaged 3.9% per annum and 1.2% in per capita terms. Inflation averaged 7.5% annually during the period. The ratio of the overall fiscal deficit to GDP averaged 4.2% during 1966-1975. This promising picture of relative macroeconomic stability changed significantly in the latter half of the 1970s and the first half of 1980s, which were characterized by declining growth rates, high rates of inflation, widening current account deficits, decline in gross domestic savings and rise in public sector debt.

One major contributor to the macroeconomic instability was the priority given to private sector development. The government's attitude toward the private sector has evolved considerably from the late 1960, when the policy position was to discourage the expansion of the sector. The ensuing macroeconomic imbalances made the adoption of the Economic Recovery Programme (ERP) and the Economic and Social Action Programme (ESAP) necessary.

The performance of the economy has thus been largely influenced by monetary, fiscal and exchange rate policies. These policies in turn determined the growth of public and private sector in the economy and subsequent investment patterns. The objective of this study is to analyse the trends in private investment in the context of past and ongoing policy reforms, determine the government policy variables that affect private investment, and estimate econometrically the model that relates investment and government policy variables.

The study is organized in eight main sections. This introductory section is followed by an overview of policy episodes prior to and during the reform period. The third section points out the limitations of the data used, while the fourth section reviews literature on the link between investment. Section five gives the link between macroeconomic policy and private investment. Section six lays down the framework of the analysis, and the results are presented and discussed in section seven. The last section draws some conclusions and policy implications.

## II. Policy episodes

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### Pre-reform period

The pre-ERP period was characterized by the extensive role of the government in the economy and an active use of a wide range of economic instruments. The most important mechanisms were the following:

- Central control of investment planning with restrictive codes on private and foreign investment:
- Administrative allocation of foreign exchange through import licensing:
- Price controls administered by the National Price Commission:
- Regulated or controlled interest rates and credit rationing according to the annual finance:
- Confinement policies that restricted wholesale trade for some imported and domestic commodities to specific parastatal organizations (Bagachwa, 1992).

With the proclamation of the Arusha Declaration in 1967 the policies of the government towards the private sector became rather hostile or at least ambiguous, so that by 1990 the role of the private sector had been neither explicitly defined nor incorporated into the second Five-Year Development Plan or the short annual plans. Institutional and policy environments were also unfavourable because they tended to frustrate rather than promote the development of the private sector. Furthermore, certain government acts and directives directly or indirectly discouraged the development of the private sector in general and micro enterprises in particular. These measures included:

- The foreign Investment Protection Act of 1963, which provided very limited guarantee for prompt and fair compensation in the event of nationalization and the right to repatriate profits and dividends.
- The 1967 Nationalization Act, which legalized the nationalization of the commanding heights of the economy, and was later extended further to include less important sectors like retailing activities, etc.
- The 1967 Party Leadership Code, which prohibited government and party officials from owning rentable property, operating private business, and holding shares or directorships in private local and foreign enterprises.
- The 1975 Ujamaa Villages Act, which prohibited private ownership of small industrial enterprises in villages. The act also abolished voluntary democratic producer

cooperatives, which were regarded as organizations that activated and fostered private enterprise initiative.

- The crackdown on “economic saboteurs” in 1983 and the enactment of the Economic Sabotage and Organized Crime Act, which created special tribunals to deal with such people. This in fact shattered the private sector, especially indigenous entrepreneurs who had started various initiatives to ameliorate the critical shortage of consumer goods (e.g., backyard textile making, spares fabrication, soap making).

The effect of these and other policies was to institute subjugation, humiliation and public scorn through laws and regulations that discouraged the development of the private sector. These were also used as an iron fist to pound on the few that looked like they might manage to survive (Mbelle, 1994).

Most of these acts and regulations have been discarded with the aim of promoting private initiative. The ERP policy package called for the deliberate and systematic removal of regulatory controls, structures and operational guidelines in the administration and pricing systems in the economy. Indeed, the ERP policy package was bound to affect private investment. The package aimed to improve the balance of payments and reduce inflation, and thus included restrictive fiscal and monetary policies supplemented by a real devaluation. Such policies might be expected to raise the real cost of bank credit or reduce the availability of credit to the private sector, or both, thus crowding out private investment. However, the high real interest rates did not significantly reduce the demand for credit because most bank credit went to marketing institutions despite their poor creditworthiness. The extension of this credit also limited credit availability to the private sector.

## Reform period

In line with the main objective of promoting private initiative in the national economy the Government adopted a number of policies:

- In February 1990 a National Investment Promotion Policy was promulgated. The objective of the policy was to create a conducive environment for attracting and promoting both local and foreign investment. The policy contains incentives and guarantees to investors as well as instruments for protection of investments, arbitration and transfer of foreign currency. An Investment Promotion Centre (IPC) was established in July 1990 to provide an effective framework for the implementation of investment policy. (IPC, 1991).
- In order to ensure better and more reliable supplies of food grains to consumers at lower costs, the government allowed cooperatives and individuals to market food grains and removed all restrictions on their transport. Further, the distribution of agricultural inputs was also formally deregulated.
- The marketing of agricultural export crops was gradually liberalized. This reduced the single channel monopoly that had controlled the six traditional crops (tea, coffee,



cotton, cashew nuts, tobacco and pyrethrum). These had been confined to cooperative societies and the export marketing was huddled largely through parastatal marketing boards, with the exception of private tea and sisal estates.

- Financial liberalization measures put an end to the financial repression experienced since the early 1970s, which had been characterized by negative real interest rates and restriction of entry into the financial system. Private banks are now allowed to operate, thus ending the monopoly of state owned banks. Apart from interest and exchange rate liberalization, financial deepening has also been taking place, hence an enhanced menu of financial instruments in the country, for example, the auctioning of treasury bills. Further, in 1994 the government enacted the Capital Market and Security Act to provide for the establishment of an authority to promote and regulate capital markets. This move should be seen as a first step in establishing a stock market facility in the country, thus widening the spectrum of securities instruments.
- In fiscal 1991 the minimum producer price system was replaced with a system of indicative prices that guided farmers in negotiating sales. Actual food grain prices paid to farmers are now determined by market conditions.
- The focus of public investment has switched from new investments to rehabilitation, particularly of the deteriorating economic and social infrastructure, as a way of raising the overall productivity of investments.
- Exports have been promoted through the devaluation of the local currency and the adoption of export retention schemes.
- Trade liberalization measures have been introduced, including the open general license and export retention schemes, a unified exchange rate, and *bureaux de change*. These instruments do ease, to a great extent, the foreign currency constraint. They are supplemented by measures to simplify the tariff structure and reduce tariff rates.
- State owned enterprises have been privatized as a means of reducing the role of the government in the production of goods and the delivery of certain services in the national economy.

The effect of these policies has been impressive as far as private investment is concerned. Private investment rose to 26% of GDP by 1991, compared with only 9% in 1984. The large increase is remarkable, since the commercial banks have been forced to accommodate the credit demands of the public sector marketing boards, uncreditworthy cooperative unions and parastatals, and until recently the central government's borrowing requirements. Loans from the banking system to the private sector averaged less than 2% of GDP, thus contributing little to the significant increase in private investment. Conversely, recorded private savings were about 14% of GDP in 1992 (Mans, 1994).

## **IV. Investment, productivity and growth**

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The macroeconomic policies of the 1960s and 1970s gave rise to investment patterns characterized by the dominance of investment in the economic infrastructure (53.4% of gross fixed capital formation) during the 1970-1973 period. This investment scenario reversed itself after 1973, so that the share of directly productive sectors, dominated by manufacturing, accounted for almost 50% of the total investment. Investment in economic infrastructure also declined in real terms. The increase in productive investment was conditioned by the adoption of the basic industrial strategy (BIS), which detailed the type of industries to be established during the 1975-1995 period. The two periods experienced peak investment/GDP ratios of 24.7% (1971) and 21.9% (1979), respectively (Ndulu and Hyuha, 1984).

Also important is the issue of productivity in relation to the patterns of investment. Where increased productive capacity is matched with adequate infrastructural support and other recurrent operational requirements, the expected incremental output should be forthcoming. Otherwise, underutilization of the created capacity leads to low productivity of investment and high opportunity costs from the committed resources (Ndulu and Hyuha, 1984). The empirical evidence in Tanzania depicts a declining trend for investment productivity. The ratio was 23.3% in 1966-1970 but fell to 11.5% in 1976-1980 and further to 4.4% in 1981-1985. However, it rose to 14.2% in 1986-1992.

In terms of sources of investible resources, the 1966-1970 period was largely dominated by domestic resources (70.7%). However, the post 1970 period relied basically on foreign capital inflows to finance the investment programme, that is, 45.1% (1971-1975) and 14.8% (1986-1992). The later figures indicate that domestic savings fell short of domestic investment.

Despite the hostility of the pre-reform period toward private initiative, the role of the private sector in the Tanzanian economy was quite significant. The sector's share in monetary GDP declined from 74% in 1968 to 64.5% in 1974. Since then it has accounted for about two-thirds of monetary GDP. If the sector was able to contribute such a high share to the GDP under conditions of a "hostile" macroeconomic environment, then in a conducive environment its contribution to GDP would likely have been much higher. This is more so when one takes into consideration the extent of the informal sector in Tanzania, which is basically private in nature.

Recent studies estimate that the number of informal sector enterprises increased at least three times under ERP when compared with the mid 1980s. Further, it is estimated that the sector employed 23% of the country's labour force in 1991 (Bagachwa and Naho, 1993).

Such indicators contribute strongly to the assumption that the private sector will continue to play a significant role in Tanzanian economy. It may further be assumed that the success of the economic recovery programmes will depend very much on the capacity and willingness of the sector to invest in the economy.

## **V. Impact of macroeconomic policy variables on private investment**

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This section identifies the more fundamental relationships between private sector investment and macroeconomic variables. The analysis is subsequently used as a basis for developing an appropriate model of investment behaviour in the economy. (See Table 1 for major macroeconomic variables from 1967 to 1996).

For the purpose of statistical analysis the developments in the economy are divided into five phases. The first phase covers the 1960-1970, period, which can be characterized as a stability and growth phase. The average growth rate of GDP was 5.6% and the inflation rate was single digit (2.83%).

The mini-recession phase of 1973-1975 was characterized by a significant decline of the economy, from the earlier average of 5.6% to an average of 4.1%. The inflation rate increased moderately from 7.6% in 1972 to 10.2% in 1973, before surging to 19.7% in 1974. In 1975, a peak inflation rate of 26.5% was reached. The mini-recession was caused by the 1973/74 oil shock combined with a severe drought.

During the third phase, 1976 to 1978, the economy grew at an average of 6.6%. The inflation rate declined from 26.5% in 1975 to an appreciable low level of 6.7% in 1979. The rate remained below 12% before jumping to 30.3% in 1980.

The fourth phase was the economic stagnation and decline that characterized the first half of the 1980s. Only 0.8% of average annual real growth rate of GDP was achieved during this period, and there were negative real growth rate in some years (1981 and 1983). Annual rates of inflation were above 26%, reaching a peak of 36.1% in 1984. The economic decline can be explained by increased resource gaps as evident by import compression, the rise in the debt service burden and the reduction in foreign resource inflows.

The current phase, i.e., since 1986, is that of economic recovery. There has been a reversal of the declining trends in economic performance. The highest annual rate of 5.1% real GDP growth was recorded in 1987, with the average growth for the period at 3%. Indeed, this rate is lower than that of 1966-1975 (3.8%), but higher than that of 1981-1985 (0.7%).

It is worthwhile to examine the trends in investment in the economy so that some insights into its link with economic performance can be seen. During the 1960-1970 period, the share of private investment to total investment averaged 14.8%; during 1971-1975, this share declined to an average of 8.7%. The share jumped to an average of 37.1% in 1976-1980 before climbing to an average of 54.9% for the five-year period of 1981-1985. The average then rose to 58.94%.

Table 1: Trends in major macroeconomic variables

	Annualchange in GDP 1976 prices	Annualchanges in moneysupply	Inflation (NCPI)	Exchange Rate Tshs/US\$	Lending rate (%)	Deposit rate (%)
1967			3.0	7.1	3.0	3.5
1968	5.5	-2.6	16.0	7.1	3.0	3.5
1969	4.4	25.4	16.4	7.1	3.0	3.5
1970	3.4	22.7	3.4	7.1	3.5	3.5
1971	4.3	17.6	4.0	7.5	3.5	3.5
1972	3.5	16.8	8.6	7.1	3.5	3.5
1973	4.9	15.3	7.0	4.0	4.0	4.0
1974	2.2	36.8	19.7	7.1	4.0	4.0
1975	5.3	24.3	25.9	7.4	4.0	4.0
1976	4.3	23.7	6.9	8.4	4.0	4.0
1977	0.4	20.2	11.6	8.3	4.5	4.0
1978	2.1	12.6	6.0	7.7	5.0	5.0
1979	2.9	46.9	12.9	8.3	5.0	5.0
1980	2.4	26.9	30.3	8.4	5.0	5.0
1981	-0.4	18.1	25.7	8.4	4.0	6.0
1982	0.5	19.5	28.9	9.5	5.0	7.5
1983	-2.3	17.8	27.1	12.5	9.0	7.5
1984	3.4	3.7	36.1	18.1	9.0	7.5
1985	2.6	28.8	33.3	16.5	11.0	10.0
1986	3.3	29.4	32.4	51.7	11.0	10.0
1987	5.1	32.4	30.0	83.7	24.0	21.5
1988	4.2	34.8	31.2	125.0	29.0	21.5
1989	3.3	29.5	25.8	192.3	29.0	26.0
1990	3.6	43.3	19.7	196.6	29.0	26.0
1991	5.7	26.9	22.3	233.9	29.0	26.0
1992	3.6	26.9	19.2	300.0	29.0	26.0
1993	3.9	34.6	26.1	408	31.0	24.0
1994	3.0	30.2	512	39	23.7	23.7
1995	4.6	24.9	29.8	581	32.0	21.0
1996	4.2	15.9	21.0	582	33.0	12.1

Source: United Republic of Tanzania (URT) Selected Statistical Series 1991: Hyuha and Ndulu (1990); Msambichaka (1992).

"Medium and longterm

Despite this upward trend in the share of private investment to total investment, there were some years of decline. For example, the share declined from 18% in 1966 to 16.4% in 1967; from 16.4% in 1967 to 15.1% in 1968; and-even more sharply-from 15.5% in 1969 to 9% in 1970.

During the second phase there were also some downward episodes of the share of private investments in the economy. For example, between 1979 and 1980, the share declined from 48.7% to 43.5%, and between 1981 and 1982 there was a decline from 56.6% to 44.8%.

A fluctuating trend in the share of private investment to GDP is observable in Table 3 for the period prior to reforms. Private investment was 12% of GDP during 1960-1970; it fell to 4.8% during 1973-1975, before rising to 9.2% during 1976-1978. After the 1973-1975 period there was a decline to 8.3% during 1980-1985. The ratio picked up to 14.3% during 1985-1990 and then to 17.5% during 1990-1996.

The major source of private investment financing in Tanzania is bank credit. An observation of trends in credit to the private sector indicates that the share of private investment declined as credit to this sector was restrained. For example, between 1967 and 1975 the proportion of bank credit (National Bank of Commerce) to the private sector declined from 95.4% to 11.7%, leading to a decline of 83.1%.

During the reform period the share of bank credit to the private sector grew from 13.1% in 1986 to 35.5% in 1990 with a peak of 38.3% in 1988. Between 1969 and 1970 capital formation in the public sector almost doubled, but then declined by 2.8% between 1971 and 1972.

On average the period 1966-1970 saw a growth of public investment of 20.7%, which later declined to an average of 12.16% between 1971 and 1975. A further decline to an average of 9.3% was registered between 1975 and 1980, when growth picked up to an average of 25.1% for the first half of the 1980s. Highest public investment rates were reached in the period after the start of the reforms, i.e., 1986-1990, to the tune of 54.4%.

While private investment percentage of GDP was picking up during the 1990-1996 period, public investment declined from 17.8% to 6.7% of GDP by 1996. The summary displayed in Table 3 indicates that growth, private investment and credit to the private sector moved in the same direction during the five phases. Periods of a high proportion of bank credit to the private sector were characterized by high levels of investment and growth of the economy. Inflation and growth were moving in opposite directions, thus underscoring that high inflation rates are detrimental to growth.

Basically, private investors are influenced by a couple of factors, which in turn determine their response to policy reforms. Among the most important is whether the would-be investors view the policy environment as sustainable. An unsustainable macroeconomic environment creates a "hit and run" or "wait and see" behaviour on the part of the investor. This phenomenon could partially explain the sharp swings observed in this study.

Another factor that may condition the behaviour of the investor is the nature of the policy involved and the manner in which such policy is sequenced. For example, response to a trade liberalization policy will be different from response to privatization. Whereas the former would have a swift, broad response, the latter would have a much slower, narrower response.

Table 2: Capital formation by public and Private sector current prices (Tsh Mill)

Year	Central government	Parastatal sector	Non-profit making' bodies	Total public sector	Private sector	Total fixed capital formation
1970	426	659	36	1,226	472	1 ,a79
1971	408	1,084	46	1,670	525	2,391
1972	335	1,160	56	1,693	469	2,208
1973	481	1,158	37	1 ,824	556	2,510
1974	708	1 ,098	75	2,194	1,070	3,701
1975	a42	1 ,098	75	2,194	1,070	3,701
1976	966	970	113	2,228	1,925	4,430
1977	1,133	2,538	69	3,740	2,763	6,663
1978	1,426	2,517	11	3,954	3,376	7,330
1979	2,032	2,353	19	4,404	4,188	a,592
1980	2,330	2,525	1a	4,873	3,757	8,630
1981	2,485	2,174	88	4,747	4,885	8,632
1882	2,369	3,533	72	5,974	4,851	1 0,825
1983	1,939	2,017	a5	3,741	4,011	7,752
1984	1,815	2,637	145	4,597	7,376	11,973
1985	2,210	4,428	152	6,782	12,942	19,724
1986	2,864	6,356	175	9,387	17,296	32,382
1987	4,410	1 a,735	251	23,778	41,297	66,946
1988	5,907	39,580	254	45,741	27,245	72,986
1989	4,784	56,699	316	61,799	39,080	100,879
1990	6,396	61,915	453	68,764	1 20,088	188,852
1991	13,695	67,847	793	82,335	258,508	262,378
1992	27,759	77,694	1,082	106,533	336,368	337,325
1993	42,320	66,136	1,968	110,424	279,420	389,844
1994	47,367	63,219	2,063	112,649	395,049	507,698
1995	19,215	63,258	2,219	84,692	445,169	529,861
1996	10,424	93,977	2,308	106,709	441,235	547,944

Source: United Republic of Tanzania(URT) "Economic Survey,1992, 1994".

Table 3: Average rates of major economic indicators (%)

	Real GDP (1976 prices)	Private investment % of GDP	Public investment % of GDP	Inflation rate
1960-70	5.6	12.2	17.8	a.5
1973-75	4.1	4.8	12.8	18.6
1976-78	6.6	9.2	11.3	9.4
1 980-85	0.8	a.3	7.9	30.2
1 985-90	3.0	14.3	9.7	28.0
1990-96	3.9	17.5	6.7	27.8

Source: Computed from National Accounts.

## **VI. The framework of analysis**

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### **Government policy and private investment**

The central issue of public policy in an economy is how best to use available resources—capital and natural endowments—to achieve economic development. In the Tanzanian economy a significant part of resources is privately owned by numerous relatively small farmers and businesses who, acting independently, contribute to flexibility and entrepreneurship, features not typical of the public sector.

A viable private sector is an important economic agent for stimulating growth. The public sector should provide—at a manageable economic cost—the necessary infrastructure and an overall environment conducive to sound investment. Without this, the private sector is unlikely to make its full contribution to development. An inefficient and ineffective government, or one with policies that significantly distort private sector decision making, will have a negative impact on both the private and public sector.

It has been observed that monetary, fiscal and exchange rate policies for correcting unsustainable macroeconomic imbalances are bound to affect private investment (Serven and Solimano 1992).

There are two ways by which restrictive monetary and credit policies included in stabilization packages affect investment. These are the rise in the real cost of bank credit and the opportunity cost of retained earnings from higher interest rates. The user cost of capital is increased by both mechanisms, leading to a reduction in investment. These effects have been pointed out by, for example, de Melo and Tybont (1986), Greene and Villanueva (1987), and Solimano (1989). Van Wijnbergen (1982), Blejer and Khan (1984b), Lim (1987), and Dailami (1990) differ, however, noting that credit policy affects investment directly, because credit is allocated to firms with access to preferential interest rates rather than through the indirect interest rate channel. Thus the effect of monetary and credit policy on investment and the means of transmission depend on the institutional structure of financial markets.

In the case of fiscal policy, Van Wijnbergen (1982) showed that for the Republic of Korea, a reduction of the public deficit during macroeconomic adjustments allows private investment to expand. How the public deficit is corrected, however, will have different impacts on investment. Serven and Salimano (1992) indicated that if the reduction of the public deficit involves cutting back public investment in components of infrastructure such as roads, ports and communication networks, which may be complementary with private investment, there will be a decline in private investment.



Studies that have used multicountry panel data to shed light on this are Blejer and Khan (1984b), Greene and Villanueva (1991), and Serven and Solimano (1991).

According to some studies of investment in developing countries, changes in output are the most important determinant of private investment. Blejer and Khan (1984b), Faini and de Melo (1990), Greene and Villanueva (1991), and Serven and Solimano (1991) arrived at results that supported the importance of changes in output in determining private investment. This has been taken as a puzzle, however, since a substantial amount of fluctuation in output appears to be transitory and therefore should not affect investment (Serven and Solimano, 1992); Shapiro, 1986).

Adjustment programmes rely on a combination of policies that cut back on expenditures and switch spending toward domestic goods in order to reduce external imbalance. Areal exchange rate devaluation is among the expenditure-switching policies that have significant consequences for investment. Devaluation affects investment through its impact on profitability, as well as its effect on the financial sector, on output and on the timing of investment. The effect of devaluation on the real value of foreign currency liabilities stems from the debt crisis of the 1980s. For firms with foreign debts, devaluation automatically raises the burden of debt, reducing the net worth of firms producing home goods (Serven and Solimano, 1992). In imperfect credit markets—a characteristic of developing countries—firms may face credit constraints or higher financing costs as creditors raise interest rates to compensate for the increased risk of default. Reduced investment will be the outcome of the financial pressures. An indirect way in which the increase in the real value of firms' foreign debt affects investment is the tightening of credit markets. As the net worth of firms falls, the quality of the portfolios of their domestic creditors also falls. Banks and financial intermediaries may be forced to reduce their exposure by cutting their loans, and hence squeezing investment. Some empirical studies done on the financial effects of devaluation and its impact on investment are Easterly (1990) and Rosenweig and Taylor (1990).

Devaluation may also reduce investment by depressing aggregate demand. Serven (1990) points out that if investment has a significant import content, the expansion of output is likely to be a necessary (but not sufficient) condition for expanding investment.

An anticipated devaluation can have a substantial effect on the timing of investment through its effect on interest rates and the future price of imported capital goods. Expectations of a devaluation represent a transitory disincentive to invest. Pending the depreciation, the real interest rate is high and investment low. Once devaluation has taken place, the disincentive is eliminated and investment rises. The effect on interest rates, however, depends on capital mobility. When capital is relatively immobile, and investment requires a high proportion of imported capital goods, an anticipated depreciation occurs (Serven and Salimano, 1992).

It is therefore important for policy makers to be able to assess how private investment responds to changes in government policy. This can be determined by establishing how private investment in the country is decided—that is, by analysing the variables that systematically affect it. A formal framework for studying private investment in developing countries was developed by Blejer and Khan (1984b). This framework was an extension of previous work in the theoretical literature on investment that yielded a well defined

class of models of the flexible accelerator type associated with Jorgenson (1967, 1971) and Hall (1977).

Sundararajan and Thakur (1980) and Tun Wai Wong (1982) incorporated features of the neoclassical model into investment models for developing countries. Their approaches take into account the relevant data problems and structural features that caused a gap between the modern theory of investment and the models that were specified for developing countries.

Blejer and Khan (1984b) focused on the role of government policy and derived an explicit functional relationship between the principal policy instruments and private capital formation. Using the model they were able to assess the extent of any “crowding out”. The second extension that Blejer and Khan did was to make a distinction between government investment that is related to the development of infrastructure and government investment of other kinds.

Blejer and Khan (1984a) found a positive relationship between the share of private investment in total investment and the ratio of total investment to income. They also found that the larger the share of private investment, the higher the average growth rate of the economy. These patterns indicate the importance of private investment behaviour in developing countries and call for the testing of formal models of private capital formation in individual countries.

Two principal conclusions emerged from Blejer and Khan’s (1984b) tests of formal model for 24 developing countries. The first was the possibility of identifying well-behaved empirical function for private investment in developing countries. This challenged the traditional view that standard investment theory is not relevant for developing countries. The second major conclusion was the establishment of a direct empirical link between government policy variables and private capital formation.

Asante (1993) estimated a private investment equation that tried to assess the determinants of private investment in Ghana. Among the independent variables were the incremental capital output ratio, the lending rate, the exchange rate, credit to the private sector and public investment. His preliminary results showed among other things a “crowding out” effect of public investment.

Ariyo and Raheem’s (1991) country estimation of the determinants of investment consisted of public investment, rate of growth of GDP, domestic credit to the private sector and interest rate as arguments in the private investment function. Their results show that all the variables were statistically significant and evidence of the existence of “crowding in” was arrived at. Martin and Wasow (1992) modeled private investment in Kenya with the real exchange rate, foreign exchange reserves, credit, public investment and income as arguments. The results showed significance of all coefficients except interest rate and income.

Most recently, investment theories have focused on uncertainty and investment irreversibility as factors that can be seriously harmful to fixed investment decisions. Investment literature concerned with the analysis of those links has shown that if investment is costly or impossible to reverse, investors have an incentive to postpone commitment and wait for new information in order to avoid costly mistakes (Serven, **1996**; Dixit and Pindyck, 1994). It has also been suggested in the literature that the

economic and political instability suffered by many African countries can pose a formidable obstacle to the takeoff of private investment (Serven, 1996; Elbadawi, 1995).

## Modeling private investment

The main concern of the study is to quantify the role of government policy in private investment. As mentioned earlier, an explicit relationship between the principal policy instruments and private capital formation was formulated by Blejer and Khan (1984b). We hereby follow that procedure. The principal policy instruments to be linked to private investment are: variation in bank credit; government expenditure on investment; the exchange rate; GDP growth; and foreign exchange availability.

With an underdeveloped capital market, financing of private sector investment relies heavily on retained profits, bank credit and foreign sources. Of the three, the flow of bank credit to the private sector is the most important source of investable resources. The role of foreign sources in the domestic investment process in developing countries is documented by Tun Wai and Wong (1982), among others, and in Tanzania in particular by Mjema (1994) and Lipumba and Noni (1993). The effects of variations in bank credit and capital flows are similar in that both tend to increase investment because of their impact on the expansion of financial savings (Khan and Knight, 1982). The desired levels of investment by the private sector are obviously affected by the varying levels of credit allocated by the government between the public and private sectors.

Interest rate and exchange rate policies also influence the amount of resources available to the private sector. For the case of Tanzania, Naho (1983) pointed out that rather than the cost of capital, the quantity of capital proves to be the principal constraint on investment.

Public and private investment are closely related in developing countries. Blejer and Khan (1984b) note this, despite the uncertainty about whether public sector investment raises or lowers private sector investment. If scarce physical and financial resources that would otherwise have been available to the private sector are used by the public sector, crowding out can occur. Similar outcomes will emerge if the private sector produces marketable output that competes with private output. Sources of finance for public sector investment would also affect private investment negatively be it through taxes, assurance of debt or inflationary finance. If public and private investment are substitutes the coefficient of adjustment of private investment would become smaller as the rate of public investment increased; conversely, complementarity would imply a faster response of private investment.

Three variations of equations were estimated to capture alternative policy variables. The first equation relates to private investment (PI) as measured by capital formation by the private sector to growth of income (GDP), credit flow to the private sector from investment banks (CRD), public sector investment (PSI), and foreign exchange availability proxied by import capacity (IMPC):

$$PI = a_0 + a_1GDP + a_2CRD + a_3PSI + a_4IMPC \quad (1)$$

Second, a variant of Equation 1 is also estimated. This separates public investment into central government investment (CGI) and parastatal sector investment (PASI). The other explanatory variables are the same as for Equation 1.

$$PI = a_0 + a_1GDP + a_2CRD + a_3PASI + a_4CGI + a_5IMPC \quad (2)$$

In the case of real crowding out the coefficient on central government investment ( $a_4$ ) in Equation 2 would be negative and in the case of crowding in it would be positive. Coefficient ( $a_3$ ) would be expected to be positive as parastatal and private sector investment are normally complementary.

In a number of studies of this kind the issue of disentangling government investment into infrastructural and non-infrastructural has received great attention. The purpose has been to find out whether government investment in infrastructure is complementary to private investment. Therefore a decomposition of the government investment is carried out and an equation that considers this new relationship is estimated.

$$PI = a_0 + a_1GDP + a_2CRD + a_3PSI + a_4INFI + a_5NINFI + a_6IMPC \quad (3)$$

In studies like that by Blejer and Khan (1994) it was recognized that it would be meaningful to isolate the infrastructural component of public investment from the other and then estimate the independent effects of the categories. In their study the data did not make it possible to make such functional distinction.

They recognized, however, that such distinctions are crucial in understanding the role of public sector investment, and they experimented with various proxies for the infrastructural and non-infrastructural components of public sector investment. They took the trend level of real public sector investment to represent the long-term or infrastructural component. Deviations of real public sector investment from the trend were assumed to correspond to non-infrastructural investment. The infrastructural investment should have a positive effect on gross real private investment, while the non-infrastructural investment would be negative in the case of real crowding out, but positive in the case of crowding in.

The alternative approach was to make the distinction between different kinds of public investment on the basis of whether the investment is "expected" or not. Blejer and Khan (1984) argued that expected public investment is closer to the long-term component and would therefore exert a positive influence on private investment. However, the effect of the unexpected or surprise component is uncertain. Expected real public investment was calculated through an empirical method, that is fitting a first order autoregressive process.

The predicted values from the equation were defined as expected real public sector investment and the residuals were defined as the unexpected component.

The empirical results by Blejer and Khan (ibid.) indicated that both trend component and expected investment are complimentary to private sector investment, while deviations from trend and unexpected real public investment have opposite effects on private investment.

In this study, we did not have to use proxies for infrastructural and non-infrastructural

investment. National accounts data provide the functional distinction required for the analysis.

Equation 1 was estimated in linear as well as in logs by OLS method and trials were done in levels and changes for the other variables, while the GDP was in growth terms. Also included in the estimation procedure were dummies to capture quantitative restrictions on private investment.

The major sources of data used in the study were National Accounts (GDP); *Economic Surveys* (investment as measured by capital formation with breakdown by type and between private and public); Bank of Tanzania Economic and Operation Reports (exchange rates); and balance of payments statistics. Data on credit from investment banks were obtained from annual reports of respective institutions.

## VII. Estimation results

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Table 4 presents the results of the three different versions of the investment function. It is seen that all explanatory variables are significant at conventional levels. While import capacity and credit variables are significant at the 1% level, GDP and public sector investment are significant at 5% level. The sign and significance of the public sector investments certify the presence of crowding in. The exchange rate variable was dropped due to insignificance, possibly arising from multicollinearity with the import capacity variable.

In the second equation, in which public investment is sorted into parastatal sector investment and central government investment, complementary is evident between these two types of investment and private sector investment as they both have significant coefficients at 10% and 1%, respectively. The negative sign of the central government investment underscores the presence of crowding out.

In the third equation an attempt was made to distinguish between public investment in infrastructure and that in non-infrastructure. Indeed, infrastructural investment significantly determines private sector investment. Surprisingly, however, from the size of the coefficient this type of investment does not seem to be important.

Dummies were introduced in the model to capture quantitative restrictions. The year 1979 (when the country went to war) and the period after 1984 (after liberalization) were taken as having quantitative impact on private sector investment. The results obtained indicate that the 1979 war did not influence private investment. However, it is evident that the liberalization of the economy after 1984 has had positive influence on private sector investment. This is seen from the positive and significant dummy variable introduced to capture this period.

Nonetheless, caution should be exercised in the interpretation of the results, which do not take into account several drawbacks. First, diagnostic tests that would have proved non-variables stationary were not done. Second, alternative specifications in differences or ratios to GDP were attempted, but the results were not very different from the reported ones. Third, the estimations might have been affected by small-sample bias, simultaneity bias and specification bias due to the short period covered. Four, the variables used and the exclusion of important determinants of investment, like the interest rate, could also have affected the results.

Table 4: Dependent variable: Private investment: **1970–1992**

Variable	Equation No. (1)	(2)	(3)
Constant	0.415	0.156	0.271
GDP	0.031	0.003	0.002
	(2.213)	(2.113)	(1.981)
CRD	0.261	0.801	0.491
	(4.10)	(5.102)	(4.691)
PSI	0.298		0.201
	(1.455)		(1.891)
CGI		-0.303	—
		(-2.384)	
INFI			0.0002
			(1.890)
NINFI			0.041
			(2.152)
DUMMY1			0.005
			(-1.1113)
DUMMY2			0.476
			(1.95)
R <sup>2</sup>	0.97	0.95	0.98
DW	1.70	1.99	1.97

t-ratios in parentheses

\*-estimated in logs

where:

- GDP = annual change in gross domestic product
- CRD = credit from investment banks
- PSI = public sector investment measured by gross capital formation by public sector
- PAS = parastatal sector investment measured by parastatal sector gross capital formation
- CGI = central government investment measured by capital formation by central government
- IMPC = foreign exchange availability proxied by import capacity; measured as the ratio of reserves over total import bill
- NINFI = non-infrastructural investment, e.g., capital formation in rural own housing, residential and the rest
- INFI = **infrastructural** investment defined as capital formation in land improvement, roads, water, energy and transport

## VIII. Conclusion

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This study adapted elements of modern investment theory to certain special features of the Tanzanian economy. A simple model of private investment was estimated by OLS. The study was able to establish a direct empirical link between government policy and private capital formation. The evidence indicates that public investment crowds out private investment, but the effect depends on the way in which public investment is introduced into the model. When a distinction is made between infrastructural investment and non-infrastructural investment, complementarity between infrastructural investment and private investment is evident.

The results show the significance of flow of credit to the private sector. Monetary policy that directs credit to the private sector is expected to encourage private investment. This emphasizes the changing environment in the financial sector whereby market forces and interest rate policy-rather than the pre-reform repressive financial measures are likely to determine credit allocation.

The supply of foreign exchange to the country is another important issue affecting private investment. A smooth inflow of foreign exchange to finance imports requires appropriate exchange rate interest rate policies.

The fiscal stance also requires serious re-examination. The reduction of public sector investment in socioeconomic infrastructure may constrain private sector investment. It is therefore advisable to increase rather than to reduce public investment in infrastructure. Given the limited resources available to government, this can be achieved by reducing government's non-infrastructural investment by encouraging private sector participation in that sector, while government concentrates on infrastructural investment.



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